

REMARKS

In view of the foregoing amendments and the remarks advanced below, Applicant respectfully requests reconsideration and withdrawal of the rejection of the claims.

Prior to the present response, claims 1-23 were pending. With the above changes, claims 1-3, 7-9, 16, 17 and 19-21 are amended, and new claims 24-30 are added. Accordingly, claims 1-30 currently are pending.

Independent claims 1-3 are amended to recite that a plasma treatment apparatus comprises *inter alia* a plasma generation unit comprising a first electrode and a plurality of second electrodes opposed to the first electrode and a unit for selectively applying a voltage to at least one electrode among the plurality of second electrodes. Support for these amendments is found, for example, at least in Figure 1 and the description thereof starting at paragraph 0038. Support for the amendments to claims 7-9 is found, for example, in the specification, at page 3, lines 12-15 and page 6, lines 18-20. Support for new claims 24-30 is found, for example, in Figure 5E and the corresponding description starting at page 7.

In the final Office Action, claim 19 is objected to for containing a minor informality. This informality has been corrected in accordance with the Examiner's suggestion.

Next, the Examiner rejects claims 7-9 under 35 U.S.C. 112, second paragraph, as allegedly being indefinite. Claims 7-9 have been changed to improve readability and conform to the amendments of respective claims 1 to 3. More particularly, claims 1 to 3 recite that the plasma generation unit comprises a plurality of plasma generators, each of the plasma generators comprise the first electrode and one of the second electrodes, and relative scanning of the plasma generators is synchronized with the application of the voltage to a predetermined electrode among the plurality of second electrodes. For example, page 3, lines 12-15 and page 6, lines 18-20 of the specification describe providing a unit for controlling plasma generation from a predetermined electrode onto the substrate to be treated by synchronizing timing of scanning:

(a) a substrate stage to which the substrate to be treated is fixed, or

(b) an electrode unit comprising the plurality of plasma generation units, and of applying a voltage to the predetermined electrode. It is respectfully submitted that the subject matter of amended claims 7-9 unambiguously encompasses at least the alternatively expressed exemplary embodiment (b). Accordingly, this rejection should be withdrawn.

On pages 3 to 5 of the Action, claims 1-6 and 10-15 are rejected under 35 U.S.C. § 103 as allegedly being obvious over Babko-Malyi (U.S. Patent Application Publication No. 2003/0106788) in view of the Seki et al. (U.S. Patent No. 6,538,387). This rejection is respectfully traversed, insofar that the Office may consider that it may apply to the amended claims.

In connection with claim 1, the Examiner asserts, with reference to Figures 1-6 and paragraphs 0027-0029, 0030, and 0034-0039, that the Babko-Malyi publication teaches an atmospheric plasma apparatus comprising a plasma generation unit (Figures 1a, 1b and 2) including a receiving first electrode 16 and a plurality of segmented second electrodes 12 opposed to the first electrode 16, a gas supply unit (not shown) for introducing a process gas into a space 19 between the first electrode 16 and the plurality of second electrodes 12, and that the plurality of plasma generation units are arranged linearly in one line or a plurality of lines. The Examiner acknowledges that Babko-Malyi fails to teach a unit for applying a voltage to a predetermined electrode among the plurality of second electrodes, but asserts that Figures 1 and 5 of Seki et al. teach a plasma apparatus that uses a substrate on which a plurality of electrodes are formed and a voltage applying unit that enables plasma generation between any predetermined pair of electrodes by application of voltage through the voltage applying unit. However, it is respectfully submitted that one of ordinary skill in the art would not have been led to combine the teachings of the Babko-Malyi and Seki et al. documents, as suggested in the Office Action, without having had the benefit of first viewing Applicant's disclosure. Further, there is no motivation found in these documents that would have suggested the modifications that would be necessary to the Babko-Malyi apparatus to arrive at the combination of features recited in Applicant's independent claims 1-3.

While the apparatus of Seki et al. can form and pattern a predetermined shape and size because the electrodes to which a voltage is applied are fixed, the apparatus of Babko-Malyi is very different in design from the horizontally spaced planar-type electrode arrangement disclosed in Seki et al. For instance, the Babko-Malyi describes an object of "producing a higher current density per unit of electrode area and more homogeneous distribution of current through the space and over the area of the electrode" (see, paragraph 0011), which does not appear to relate to any particulars about spatially concentrating plasma generation in relation to an area to be treated. Indeed, the apparatus of Babko-Malyi appears to work to produce plasma in bulk because all the segmented electrodes are connected to a high voltage

power supply 10 and all of the segmented electrodes are simultaneously supplied with this voltage each time a high voltage is applied. Thus, the Babko-Malyi publication appears to *teach away* from a unit for selectively applying a voltage to a predetermined electrode, as recited in Applicant's independent claims 1 to 3. Additionally, there is no suggestion in Seki et al. to selectively supply a high voltage in an apparatus such as disclosed in Babko-Malyi. It is respectfully submitted, therefore, that the proposed modification based on the Seki et al. patent would change the principle of operation of the Babko-Malyi reference, which is an insufficient teaching for rendering the claims *prima facie* obvious. See, MPEP § 2143.01.

Moreover, Seki et al. does not teach how to apply a voltage selectively in detail. Furthermore, it would appear, for the sake of argument, that even if one were to consider the proposed combination, a plurality of the high voltage power supplies described in Babko-Malyi would be required. As a result, the apparatus of Babko-Malyi would become undesirably large if modified to selectively apply voltage to the segmented electrodes.

For all these reasons, it is respectfully submitted that the proposed modification of the Babko-Malyi apparatus is not suggested in either Babko-Malyi or Seki et al. As a result, it is respectfully submitted that the motivation derived from these documents could not have been arrived at without the benefit of having first read Applicant's disclosure. Of course, any such hindsight-based reasoning is impermissible.

Furthermore, with respect to independent claims 2 and 4, it is respectfully submitted that the Examiner's assertion that Babko-Malyi teaches a segmented electrode "can have different shape/configuration as required (Paragraph 0027)" (see, the last line of page 4) does not substitute for the required factual basis, within the meaning of Section 103, which is necessary to establish a *prima facie* case for the specific features recited. More particularly, the part from Babko-Malyi relied upon is too general, and thus does not teach or suggest the claimed features of "wherein at least one of the plurality of second electrodes has a length of equal to or less than 1 mm on a side of an object to be treated," as recited in claim 2, and "wherein at least one of the plurality of second electrodes has a length of equal to or less than a square of a line width of the pattern on a side of the object to be treated," as set forth in claim 3. Hence, for these additional reasons, claims 2 and 3 are allowable.

In contrast to the applied documents, Applicant's claimed apparatus includes an arrangement that facilitates plasma generation for different purposes by controlling a shape and size of an electrode to be processed, and various kinds of patterns can be formed at a

time. Consequently, generation of a particle is suppressed and a photolithography process becomes unnecessary (e.g., see page 5, line 29 to page 6, line 4, and page 2, line 3-15 of Applicant's specification).

For at least these reasons, it is respectfully submitted that the Examiner has failed to establish a *prima facie* case of obviousness with respect to independent claims 1-3, and thus also the claims depending therefrom. See, MPEP § 2143.

The final Office Action also includes a rejection of claims 7-9 and 16-23 as allegedly being obvious over the Babko-Malyi and Seki et al. documents as applied to claim 1 and in further view of Suzuki et al. (U.S. Patent Application Publication No. 2002/0064597). However, it is respectfully submitted that the Suzuki et al. publication's description of controlling a single plasma head does not remedy the deficiencies pointed out above with respect to claims 1 to 3, much less, for example, the relative scanning of plasma generators as recited in claims 7 to 9.

New claims 24-30 also are believed allowable over the applied Babko-Malyi, Seki et al. and Suzuki et al. documents. For instance, claim 24 recites an apparatus including *inter alia* "a plurality of plasma generation units each comprising a first electrode and a plurality of second electrodes ... a gas supply unit for introducing a process gas into a space between the first electrode and the plurality of second electrodes ... a unit for selectively applying a voltage to at least one electrode among the plurality of second electrodes" It is respectfully submitted that the Babko-Malyi, Seki et al. and Suzuki et al. documents, whether considered individually or in any combination, would not have taught or suggest this combination of features.

Based on the foregoing, Applicant respectfully submits the present application is in condition for allowance. Prompt notification of the same is earnestly sought.

Respectfully submitted,

/John F. Guay, Reg.# 47248/
John F. Guay

NIXON PEABODY LLP
Suite 900, 401 9th Street, N.W.
Washington, D.C. 20004-2128
(202) 585-8000